
Space Weather Forecast

Issued on Friday, 13 September 2024 at 01:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Minor to Moderate geomagnetic storms likely day 2 (14th Sep). Moderate to High solar activity.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Has been High with a Strong flare at 12/0943 UTC from a new region that has rotated onto the southeast limb. There are eight sunspot regions, including this one, with four of these forming a cluster of small and magnetically simple sunspots in the southwest disc. One of the significant regions on the disc is in the northwest, with a weak mixed magnetic polarity spot ahead of its main large symmetrical trailer spot, leading to some increasing complexity. The new region on the southeast limb is likely to have a complex magnetic structure, and will be analysed once the region rotates further onto the visible disc.

There were no Earth-directed CMEs (coronal mass ejections) observed in this period.

Solar Wind / Geomagnetic Activity: Two CMEs were observed arriving, the first from the 08 Sep Coronal Mass Ejection (CME) which arrived at 12/0253 UTC. The second, which is likely to be an early arrival of the 10 Sep CME, at 12/0820 UTC. The solar wind speed from background levels to become slightly elevated, and there after continued to rise in steps to become strong, peaking at 623 km/s at 12/1714 UTC. Later in the day the solar wind declined slightly to elevated levels. The Interplanetary Magnetic Field (IMF), B_t, was initially Weak, but increased to Moderate with the arrival of the first CME. This rose further with the second CME, becoming Strong. The north-south component remained unremarkable with the first arrival, but became mainly negative (southward) from 12/0340 UTC with brief positive (northward) spells, with periods of Moderate to Strong southward field. The phi angle was variable at times. Geomagnetic activity was Active with the first arrival, but after the second arrival increased to Moderate storm levels between 12/0900-1800 UTC and then Strong storm levels 12/1800-2100 UTC, then declining to Minor Storm levels late to end the day.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was steady at near background.

Four-Day Space Weather Forecast Summary

Solar Activity: High to moderate activity expected with Moderate class flares expected and a slight chance of further Strong (X-class) flares.

Solar Wind / Geomagnetic Activity: Current CME influence is expected to ease through today (13 Sep), before a further arrival is anticipated. This is from the Moderate class flare on the 10th. This is forecast to arrive either very late today, but more likely early on day 2 (14 Sep). Coronal hole fast winds could potentially arrive day 3 (15 Sep) and continue through day 4 (16th). Geomagnetic activity is expected to be Active to Minor Storm at first today (13 Sep), with a chance of an isolated Moderate Storm intervals, before easing to Quiet to Active later today. With the next CME arrival Minor-Moderate Storms are likely, especially early day 2 (14th Sep).
Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

Quiet to Active conditions develop later day 2 (14th Sep), and persist through day 3 and 4 (15th and 16th) with a chance of Minor geomagnetic storms from the fast wind enhancement.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at near background, but with a slight chance of enhancement given any further notable flares, especially from the sunspots on the southwest limb.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	Yes	80	70	30	10
Strong	G3	Yes	5	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	75	75	70	70
Very Active	R3 to R5 X	Yes	20	20	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)